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Application of X-Ray microtomography in calculating the filtration characteristics of porous media

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Abstract

© Medwell Journals, 2016.This study deals with the problem of application of X-ray microtomography in calculating the absolute permeability coefficient of cores of oil reservoirs. To simulate the process of fluid flow using the digital tomographic images of pore channels both the continuity equation and stationary Navier-Stokes equations were used. Researchers compared the filtration characteristics of porous media calculated on the basis of the model proposed in this study with the permeability coefficients calculated by the Kozeny-Carman equation. We have shown that the permeability coefficients calculated by the Kozeny-Carman equation give higher values as compared with the filtration characteristics calculated by both the Navier-Stokes equation and the continuity equation. We have revealed that the reservoir properties of cores, calculated on the basis of microtomographic data can be extrapolated to the samples of larger porous media.

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Keywords

Absolute permeability coefficient, Fluid flow, Modeling, Sandstone, X-ray micro-CT